National Environmental Trust

The Environmental Action Network for the 21st Century

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Subcommittee on Water Resources

Barriers to the Cleanup of Abandoned Mine Sites
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On behalf of the National Environmental Trust, I thank the Subcommittee for this opportunity to testify on the important issue of cleaning up abandoned mine sites.

The topic of this hearing is "Barriers to the Cleanup of Abandoned Mine Sites," and I know that the Committee will hear testimony about the role of environmental laws in discouraging mine cleanups. I would begin, however, by asking you not to be too quick to narrow your focus to perceptions of liability as the primary culprit behind lingering problems. Rather, we urge you to consider other factors -- factors that loom even larger in the challenge to clean up abandoned mining sites.

Consider, first, the sheer size of the universe of abandoned mine sites and the diversity of that universe – from relatively modest areas of waste rock or small scale tailings piles to vast mining complexes. Consider also that the vast universe of abandoned mine sites keeps growing larger, even as we sit here today.

In addition, though I realize you may tell me that I'm in the wrong hearing room, we would argue that the single most compelling barrier is not regulatory but financial: Mining sites are not being cleaned up fast enough because neither the industry nor the government is contributing sufficient money to the task. The federal budget is tight, but to really address this problem, you must find a way to bring more resources to a serious cleanup effort.

We would also remind you that while fear of liability may, in some cases, give pause to true "Good Samaritans" who would otherwise venture into mine cleanup, that pause, in and of itself, may not be a bad thing when it comes to cleaning up these difficult messes. Mining sites can be not only difficult to diagnose but also enormously difficult to cure. Entered upon without solid information, with poor design or with faulty execution, cleanups can and have gone terribly wrong.

Finally, we urge you to consider that liability for both previous operators and land owners is an important factor that has been driving many cleanups. If Congress reaches too broadly to encourage the cleanup of the most easily remedied mine sites, it will put at risk the current liability leverage that leads to cleanup of enormously difficult and expensive mining messes. And if your solution brings remining operations into the definition of "Good Samaritan" actions, you may end up creating the exception to swallow the rule, removing normal, for-profit operations, which nearly always take place in old mining districts, from existing regulatory requirements.

So please, don't look simply through the narrow prism of regulatory hurdles for cleaning up a few of the many mining problems. Look broadly at the full scope of the problem and recast your topic as "Solutions to Mining Contamination." In that context, figure out not only how to drive more of the easier cleanups but also how to stop adding to the problem and how to address the large and seemingly intractable mining messes.

Hardrock mining is enjoying a boom. Metals prices are breaking records; exploration fever has once again hit the West; and even old operations that seemed like economic losers are attracting new attention. So now, while hardrock mining is flush, is the time to engage the industry in cleaning up its past and current operations.

A Big Problem

In 1993 the Mineral Policy Center, now known as Earthworks, assembled data on hardrock abandoned mines from state and federal agencies, private contractors and associations.[1] From this effort, they estimated nearly 557,000 abandoned hardrock mines in 32 states. Their numbers, though perhaps considered high at the time, are generally in line with other best judgments – including estimates from the Western Governors' Association, the Bureau of Land Management and the Environmental Protection Agency.

A compilation of abandoned mine land data assembled by the Western Governors Association, for example, shows counts ranging from 150 abandoned mines in North Dakota to 100,000 in Arizona.[2] The WGA report cautions that different states use different definitions of abandoned mines and count mines and mine sites in different ways. It also clearly acknowledges that existing inventories are incomplete. The report's numbers for 13 states total more than a quarter of a million.

Estimates from Federal agencies are high as well. BLM, for example, places the number of abandoned mines on lands that it administers at a low of 100,000 or a high topping half a million.[3] About 5 percent of those sites – possibly more than 25,000 mines -- have caused or could cause environmental damage, according to the Bureau. The Forest Service estimates that about 5 percent of an estimated 25,000 to 35,000 abandoned mines on its lands will require

[1] Mineral Policy Center, Burden of Gilt, June 1993.
[2] Western Governors' Association, Abandoned Hardrock & Noncoal Mines in the West: A Partnership Report, 1998 available online at http://www.westgov.org/wga/publicat/miningre.pdf.
[3] US EPA, Office of Solid Waste and Emergency Response, Cleaning Up the Nation's Waste Sites: Markets and Technology Trends, September 2004.

cleanup under Superfund authorities; another 12 percent of those sites are expected to require water-related cleanup using authorities other than Superfund. Excluding lands in Alaska and California, the National Park Service estimates the number of abandoned sites on its lands at 2,500.

A Varied Universe, in the West and Beyond

What types of sites are these and what types of remediation is called for? The answers run the gamut from small problems to large complexes. And though much of the focus in this discussion is on the West, where the number of sites is huge, there are mine messes in other parts of the country as well.

In some instances, the highest priority problems may be open shafts and adits that pose physical hazards to people and wildlife. These must be plugged, filled, secured or closed off.

- A motorcyclist was killed in 2003, for example, when he rode his bike over a tailings pile directly into an open mine shaft in the Red Mountain area of California.
- In Nevada, the state reports that people have died swimming in open pit lakes and suffocated after entering open mine shafts.
- Wyoming has reports of mine subsidence affecting an interstate highway, a public water line and a housing development.
- In Alaska, 500 feet of dangerous high wall was reported in a heavily used area near Juneau, and open portals and shafts found within a few hundred feet of a public use cabin in a state park
- In Oklahoma, the community has learned that a third of the small town's 400 houses sit atop or near a huge mining cavern with a probability of collapse."[4]
- In California alone, the Office of Mine Reclamation has stated that 84 percent of the state's abandoned mines –that's nearly 33,000 mines – present physical hazards.[5]

In other cases, the threats are from elevated levels of pollutants in mine wastes, contaminated soils, blowing tailings and abandoned ponds of cyanide solutions or other wastewaters. Abandoned mines, as the U.S. Geological Survey reports, may degrade water quality and aquatic resources with releases of acid drainage, seepage from tailings piles, streambank erosion and storm runoff.

Overall, the government estimates that old mines have contaminated about 40 percent of all Western river headwaters, and scientists have reported loss of fish populations and deterioration of fish health as well as groundwater contamination, including contamination of drinking water wells, all associated with continuing pollution from abandoned or inactive mines.

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[4] Omer Gilham, "Calls for Tar Creek buyouts intensify: A Corps of Engineers report brings home to residents the dangers of possible cave-ins," Tulsa World, February 2, 2006.

[5] California Department Of Conservation, Office of Mine Reclamation, Abandoned Mine Lands Unit, California's Abandoned Mines: A Report on the Magnitude and Scope of the Issue in the State, June 2000.

- In Arkansas, for example, a 1996 report attributed problems in nearly 200 miles of streams to the impacts of old lead, zinc and coal mines.
- In Oklahoma, a report from that same year identified 23 lakes and streams adversely impacted from past and then present mining operations.
- In Utah an estimated 300 uranium mines have moderate to high levels of radiation.
- A 1999 Nevada report on abandoned mines notes problems with breached tailings dams spreading heavy metals and acidic wastewaters, elevated levels of contaminants including mercury, lead, cyanide and arsenic from abandoned mines, and mining-related threats to local agricultural activities and the habitat of the endangered Desert Tortoise and the Northwest Valley Fly Catcher.
- In March of 2005, a "flash report" by the Department of Interior's Office of Inspector General reported dangerous levels of arsenic and contaminated groundwater in a growing area of Pima County, Arizona.

Solutions to these problems will run the gamut as well, ranging from removing small piles of waste rock or tailings from a floodplain or reseeding a disturbed area, to removing transformers, machinery and buildings, stabilizing large waste piles, rerouting water flows, building new retention ponds, reinforcing old dams, managing toxic lagoons, removing or covering contaminated soils.

Old and New Contributions to the Problem

Much of the discussion of abandoned mines brings to mind the grizzled prospector with mule and pick axe, faded sepia-tone images and thoughts of the Wild West. But before you assume that the nation's abandoned mine messes all date from the 19th century, well before modern environmental regulation, consider this.

Modern-day mines are often located in historic mining areas, where mining wastes have been deposited in stream beds and other fragile areas, and where acid drainage still flows from old mine workings. In some cases, this makes it difficult to say with certainty just how much of a pollution problem is linked solely to recent activity.

In many instances, however, it is clear that modern operations not only worsen existing problems but also create new problems. Modern mine operations can cover large acreages and employ enormous earth-moving equipment. Frequently they use large amounts of toxic chemicals, and collectively they release more toxics into the environment than any other industry. Their impact on the environment is enormous – and not always according to plan.

- Perhaps the most notorious example of a modern mine gone wrong is from Colorado. The Summitville gold mine opened in 1986 and was abandoned in 1992. It became one of the nation's most expensive Superfund cleanup sites, while the Canadian business tycoon behind the venture moved his schemes and his assets overseas. The Summitville area had a long history of mining, but the acid and cyanide drainage that killed miles of the Alamosa River were clearly connected to this faulty heap leach mine operation.

- In 1996, Canyon Resources boasted that reclamation of the northern section of its Kendall heap-leach operation was 90 percent complete, and they predicted that they would rinse out the "last traces of cyanide" through the next year. Reclamation of the mine that opened in the late 1980s is still incomplete today, and according to Montana news reports, the mining company is resisting State calls for more extensive cleanup. Canyon extracted gold and silver from the ground from 1989 until 1995. Treating the mine-contaminated water, says the State, will have to continue indefinitely.

- Near Riddle, Oregon, a now-defunct Canadian company ran the Formosa copper and zinc mine between 1990 and 1993. The company abandoned the 100-acre property in 1994, and by 1997 the system they had installed to handle acid mine drainage was no longer working. As is the case with many other mines – some reclamation was accomplished by the company before its departure, but those efforts did not stop copper, cadmium, lead and zinc from polluting some 18 miles of a nearby stream. According to the state, the contamination has "…severely harmed the ecosystem of these streams, including protected Coho and Steelhead salmon populations."

- Idaho's Grouse Creek mine began production in 1994, and its tailings impoundment, declared "state-of-the-art" when it was built, included clay and plastic liners and, according to a company spokesperson, exceeded permit requirements. But Hecla's gold find wasn't as rich as anticipated, and the company ran into processing problems. In July of 1995, EPA cited this mine near the Frank Church Wilderness for violations of cyanide, mercury and total suspended solids water quality standards. The problem: leakage from the impoundment liner. A month later, it was the pipeline carrying slurried mill wastes that caused more violations. In 1996, according to the U.S. Forest Service, another 19,000 gallon spill occurred in the mill area. The mine closed in 1997 and by 1999 "pervasive levels" of cyanide were found in Jordan Creek.

I could go on. But suffice it to say that mining's mistakes have and will always be characterized by the mining industry as its misguided past. In the 1970's, history included the turn-of-the-century gold rush mines as well as mine operations from the 1940s and 50s. Now, it appears, that mines from the 1960s, 70s and 80s have taken their place in "history" as well. By 2020, will the mines of today be lumped in with those "turn-of-the-century" mines that bear all the responsibility for pressing pollution problems?

From Brewer Gold in South Carolina to the Battle Mountain mine in Nevada, from Zortman Landusky in Montana to Red Dog in Alaska, modern mines have given us ample evidence of continuing pollution problems. The facts on the ground suggest that regulation -- even today -- is sorely lacking in substance or enforcement, or perhaps both. And in too many instances mining companies seek the shelter of bankruptcy courts before they meet their reclamation and cleanup obligations.

We agree with the National Center for Manufacturing Sciences: "[T]he mining sector is, from an environmental standpoint, the *least* regulated of any comparable industry sector." (Emphasis in original.) The Center goes on to state that the lack of regulation for mining "is no chance oversight," but actually the result of a specific legislative loophole. Their reference is to the so-

called Bevill amendment that shields the mining and mineral processing industry from federal hazardous waste rules. This hard-fought and carefully protected special deal for mine-related wastes keeps EPA from regulating wastes derived from extraction and beneficiation of minerals, even if they met established criteria for designating wastes as "hazardous."

These wastes are frequently the crux of the problem at abandoned mine sites.

EPA issued a National Hardrock Mining Framework in September of 1997, with the specific aim of improving environmental protection with coordination and collaboration across programs and agencies, but in August of 2003, the EPA Inspector General declared that it "…found no evidence that the Framework contributed to environmental improvements or protections at specific hardrock mining sites." The IG noted that the Framework's goal of protecting human health and the environment at hardrock mining sites was hampered by EPA's lack of direct regulatory authority.

In addition, as the Government Accountability Office made so clear in its August 2005 report,[6] the federal government's cleanup burden grows as businesses reorganize and restructure to limit their future expenditures for environmental cleanups. GAO points out that "EPA has not yet implemented a 1980 statutory mandate under Superfund to require businesses handling hazardous substances to maintain financial assurances" for environmental cleanups.

Only two months earlier, the GAO also concluded that BLM's failure to obtain proper financial assurances from mining operations on federal lands has left a gap of some $56.4 million in unfunded reclamation costs.[7] That number, by the way, covers only 48 hardrock mines that had ceased operations by the time the study was undertaken. It doesn't cover mines that are still operating.

A Matter of Money, Lots and Lots of Money

Because abandoned mine inventories have not been completed – and indeed may never be -- it is difficult, if not impossible, to offer any certainty about the likely costs of addressing these problems. Some sobering numbers have been put forward, however.

Earthworks, working with experienced mining engineers, has predicted that approximately 15,000 mines would require cleanup of water-related problems. The cleanup tab for the full universe of abandoned mine sites, according to the group, may run as high as $72 billion.

In January 2003, the EPA Inspector General reported that 87 sites classified as abandoned hardrock mines or mine-related sites had been placed on the Superfund National Priorities List (NPL).[8] At the time of the IG's report, EPA's rough estimate of cleanup costs for these specific

[6] US Government Accountability Office, "Environmental Liabilities: EPA Should Do More to Ensure that Liable Parties Meet Their Cleanup Obligations," August 2005.
[7] US Government Accountability Office, "Hardrock Mining: BLM Needs to Better Manage Financial Assurances to Guarantee Coverage of Reclamation Costs", June 2005.
[8] Office of the Inspector General, US EPA, Nationwide Identification of Hardrock Mining Sites, March 31, 2004, Report 2004-P-00005.

sites was about $2 billion. Since then, more mine-related sites have been added to the list – and many more are possible candidates.

Looking beyond these few sites, EPA's Superfund office has predicted that somewhere between 7,700 and 31,000 mines will require cleanup – either under Superfund or under another program.[9] An EPA report on the cleanup technologies, notes that the need for cleanup grows as the public looks increasingly toward rural areas for recreation and as some old mining areas are developed for primary housing or second homes. Data from several sources cited in this report indicate a range of cleanup cost running from $20 to $54 billion, with about $3.5 billion of that related to Superfund designated sites.

The Bureau of Land Management estimates that cleanup of abandoned mine sites in its jurisdiction may cost as much as $35 billion.[10] Damage on U.S. Forest Service land alone would cost $4.7 billion to fix.[11]

How do expenditures match up against these figures? According to EPA[12], the total federal, state and private party outlays for mining site remediation have been averaging about $100 million to $150 million per year.

At this rate of expenditure, notes the report, only 8 to 20 percent of all the cleanup work will be completed over the next 3 decades.

No Easy Solutions

And now for the bad news. Cleaning up mining problems can be, not only expensive, but also technically challenging.

The case of the Penn Mine in California – the case that initially prompted the call to loosen Clean Water Act requirements for mining cleanups – makes the point.

The abandoned old copper mine in the Sierra Nevada Mountains was producing acid mine drainage flowing into the Mokelumne River watershed, the same watershed that provides drinking water to the East Bay Municipal Utility District. The water utility, with the best of intentions, took on what it apparently thought would be a modest project to protect downstream fish and its water source. The Utility constructed a small dam, diversion facilities and retention ponds. Unfortunately, however, the results fell short.

The ponds were not sized properly and maintenance of the structures was reportedly minimal. So the facilities – though they solved some problems – actually created additional problems at

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[9] US EPA, Office of Solid Waste and Emergency Response, Cleaning Up the Nation's Waste Sites: Markets and Technology Trends, September 2004.
[10] Ibid.
[11] Robert McClure and Andrew Schneider, "More than a century of mining has left the West deeply scarred," The Seattle Post-Intelligencer, June 12, 2001.
[12] US EPA, Office of Solid Waste and Emergency Response, Cleaning Up the Nation's Waste Sites: Markets and Technology Trends, September 2004.

certain times of year. People in the community were upset and took legal action to compel more cleanup. The Utility found itself with a long-term cleanup job that it had not initially anticipated.

Was this particular "Good Samaritan" particularly inept or sloppy? Probably not.

- In 1997, a mining company in Arizona was attempting to cover a tailings impoundment with waste rock. The impoundment failed and tailings and debris moved into Pinto Creek.[13]
- In Montana, a mining company reconstructed a tailings dam that had failed. Today, the State, the Forest Service, the EPA and the community are searching for answers and money to fix this previous "fix" that is now leaking and considered unstable. The company involved in this case and dozens of others is in bankruptcy.
- A host of engineers tried to address the problems of acid drainage running through the Oklahoma lead mining district some 20 years ago. They apparently managed to keep acidic waters from returning to the surface through unplugged boreholes, and they thought they got it right with water diversions and "rerouting." But just recently monitoring has shown high levels of lead and arsenic headed toward Oklahoma's Grand Lake.

In other words, mining problems can be a bear to solve.

An adit may be plugged, only to blow out as water pressure increases. New seeps from a closed tunnel may open up, not at the original point of discharge, but in other unexpected areas.[14] Constructed wetlands may function for a time but cease their cleaning function when they reach a point of saturation. Acid-generating rock may be encountered where none was anticipated; a season of drought, can pull groundwater into a pit lake faster than expected; storms or heavy snowmelt overwhelm the capacity of detention ponds.

These examples are offered, not to suggest that nothing can be done to abate the problems of mining, but only to caution against a "solution" that tries to fast-track decisions that should not be fast-tracked, that skims over the need for critical baseline data, that imposes unreasonable deadlines on those reviewing cleanup plans, or that skimps on oversight.

These real world lessons also remind us that time is an element to be reckoned with in mine cleanup efforts. In many cases, mining cleanups will have to be viewed as holding actions, and responsibility for long-term management must fall to someone, if not to the party that initiates cleanup. According to EPA, nearly 60 percent of the mining sites listed on the Superfund NPL are expected to require from 40 years to "perpetuity" for cleanup operations.[15] Many other mine sites will require long-term maintenance and vigilance in similar time frames.

[13] US EPA, Region 9, "Total Maximum Daily Load for Copper in Pinto Creek, Arizona," April 2001.

[14] See, for example, "The Earth's Open Wounds: Abandoned and Orphaned Mines," Environmental Health Perspectives, Volume 111, Number 3, March 2003.

[15] Ibid.

These examples also make it clear that a directive to "do no harm" may be difficult to follow. Because things can go wrong, despite the best of intentions, we think it would be more than reasonable for any provisions that encourage "Good Samaritan" actions to also ensure against the unforeseen. Financial assurance would add an upfront cost to cleanup projects, but that cost would be a small fraction of a project's overall cost. It could be subsidized by a bond pool or special trust, and its existence would help to ensure that the cleanup projects undertaken today do not become tomorrow's emergency removals, that what are anticipated to be small projects do not end up draining the government's resources for response and remediation.

Liability Plays a Useful Role

It is, no doubt, frustrating to hear of cases in which a willing Samaritan hesitates to act because he doesn't want to become embroiled in Clean Water Act permitting, is wary of a citizen suit or fears the reach of Superfund liability. But consider that there is another side to that coin. Liability, in many instances, is driving cleanups.

In Nevada, a 3,500-acre copper mine has long been known to have unreclaimed tailings and other problems, but only in the last few years has the surrounding community learned that the old mine site has serious problems of radioactive contamination. The course has been difficult and it will take many years to clean the site, but progress on the site is being made, because the property owner is compelled by Superfund liability to proceed.

In Utah, the Kennecott case is instructive. It has been heralded as a "voluntary" effort to clean up massive amounts of groundwater, but the more than 20-year cleanup was "voluntary" only in the sense that Kennecott negotiated out and agreed to a cleanup plan -- after complaints were filed by regulatory agencies. In 1986, the State Health Department, acting as Trustee of Natural Resources as provided for under the Superfund law, filed a complaint against Kennecott Utah Copper Corporation for groundwater contamination. Superfund liability, again, drove cleanup.

In the Copper Basin of Tennessee, at the Rio Tinto mine in Nevada and in dozens of other cases, cleanup and stabilization happens, not in spite of liability, but because of it.

Congress Can Act

The problems of abandoned mines are large and difficult, and Congress should be wary of simple solutions. Any effort to "encourage" cleanups with exemptions from Clean Water Act obligations, or worse still, from Superfund liability, is fraught with difficulty.

If a "Good Samaritan" is relieved of achieving Clean Water Act standards, what standards must they achieve? Over what time frame? If a remedy fails, who bears responsibility? Who can be called upon for additional work or for maintaining treatment systems and reclamation work? Should there be a size or "class" limit on exempted projects – should the line be drawn at revegetating or removing waste piles? Should "Good Samaritans" tackle major mining complexes? What data should they have in hand to assure that they understand critical aspects of water flow and geochemistry?

It would be nice to think that there's a responsible way to answer these questions and make these distinctions in law or by rule, but there may not be at this time. Useful generalities are hard to come by, and the wrong generalities could take us backwards rather than forwards in the quest for cleanup.

So what to do instead? We have a few recommendations.

1. Endorse EPA's efforts to use a model consent agreement to promote "Good Samaritan" projects, and draw on your own water quality expertise to craft, not a broad exemption, but a major demonstration project. Engage one or more states along with all the relevant federal agencies, allowing interested states to look on a watershed basis for those areas where they believe that modest, voluntary efforts could bring lasting improvements in water quality. One option would be to do this in the context of TMDL or Total Maximum Daily Load reviews for particular watersheds. A watershed focus can assure that the broader context is kept in mind and that individual projects do not unintentionally improve water quality for one parameter or in one location only to undermine it elsewhere. In addition, several projects within a single watershed may be able to share important baseline data and technical information. Within this context, and only within this context, allow for alternatives to the traditional National Pollutant Discharge Elimination System permits. Provide funding to get the demonstration program going, including funds to support a team of mining reclamation experts that will act in an advisory capacity to all chosen projects and to underwrite financial assurances for dealing with unforeseen problems. Assure that all projects have appropriate oversight, and require a report – say on a two-to-three-year time-frame – about successes and problems with the projects chosen. At that point, renew the effort to answer some of the questions I have just posed and, if necessary, amend the Clean Water Act to allow for new mining cleanup best practices by "Good Samaritans."

2. At the same time, look to the mining industry to help fund cleanup of abandoned mines, following the model set out for coal mine restoration under the Surface Mining Reclamation and Control Act (SMCRA). Congress should impose a tonnage fee on all metals mined from private and public land to fund a serious, long-term remediation program. Use the resulting trust fund to pay for cleanup at old sites where responsible, solvent entities cannot be found.

3. In addition, boost federal funding for cleanups and provide for coordination and sharing of funds among states, BLM, Forest Service, EPA and other appropriate agencies. By encouraging federal agencies and the states to do joint planning and to pool resources, the best expertise and capacities of many parties can be leveraged for the maximum results.

4. Engage states and federal agencies in developing adequate inventories of sites and, perhaps more importantly, selecting priority areas for voluntary cleanups and for re-invigorated enforcement-driven cleanups.

5. Direct EPA to get off the dime and issue rules for financial assurance for the mining sector, which makes such an enormous contribution to the country's Superfund burden. This duty already exists in law, so you don't have to pass new legislation. Make things happen with directions and appropriations.

6. Don't tolerate the continued creation of abandoned mine messes. Stop the creation of additional mine problems by first clearly defining "abandoned," as recommended by the National Academy of Sciences and as done under SMCRA. And begin work on legislation to set out minimum performance standards, strong financial assurance requirements and clear permitting guidelines. Have the agencies create clear requirements for operators to notify regulators of changing conditions at operating mines, and be certain that mine permits – as well as bonding amounts – are updated as conditions change. Set out monitoring and reporting requirements as well fair and firm enforcement mechanisms. Build regulatory capacity and expertise in the field with grants to support state programs.

7. Weed out irresponsible investors and operators with solid "bad actor" provisions to deny future permits or government contracts to companies that violate environmental rules or walk away from reclamation obligations. Make sure bad actors cannot hide behind corporate reshuffling and creation of new subsidiaries.

8. Deal with the most dramatic regulatory loophole for mine operations by directing EPA to establish waste regulations specifically crafted for the management of mine waste rock, tailings or other mineral-processing wastes, including wastes currently covered by the Bevill amendment.

9. Invest in research that will allow for more reliable predictions about mining's impacts on water resources, looking closely at the potential for creating acid mine drainage but also focusing on other difficult issues, such as disruption of aquifers from dewatering, mechanisms for groundwater contamination and impacts of pit lakes that refill with acids, metals and other pollutants after mine operations cease. Make sure that the best available predictive tools are used to plan cleanups and to permit mines in the first instance.

10. Learn from past mistakes with failure analyses conducted in conjunction with mine cleanups. Whenever federal dollars or enforcement authorities are used for cleanup of a mine site that operated during the mid-1980s or forward, regulators should analyze those aspects of the operation that led to a need for cleanup. As these analyses identify problem management areas – be they heap leach pads, faulty liners, pipeline breaks, unstable waste piles, poorly characterized geology or something else – regulators should act to disseminate new information on "best practices" and, as necessary, adopt new regulations to prevent repeat failures.

11. Commit to carrying out your oversight duties. This is a thorny issue, but there is much activity in the field. Congress should keep a close eye on developments, positive and negative, regarding mining and water quality.

Again, Mr. Chairman, I appreciate this opportunity to testify, and I hope that Committee members find this information and these recommendations of help. I look forward to your questions and to working with your staff on these important issues.